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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

NGUYEN, HA T

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 04/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/025,438

Applicant(s)

FAZELPOUR, SIAMAK

Examiner

Ha T. Nguyen

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 10 February 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Notice to applicant

1. Applicant's Amendment and Response to the Office Action mailed 10-4-02 has been entered and made of record (Paper No. 4).

Response to Amendment

2. In view of Applicant's amendment to the claims, the rejection of claims 9-11 and 25-27 under 35 U.S.C. 112 first paragraph, has been withdrawn.

Applicant's arguments with regard to the rejections under 35 U.S.C. 103 have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicant argued that Giri et al. (U. S. Patent 6261467, hereinafter "Giri") in view of Naya (U.S. Patent 6077765) fails to teach a second conductor connected to a first conductor or a second isolation layer situated over the second conductor in the manner taught by the present invention. The examiner disagreed, in Giri, when considering 102 to be the first conductor, 110 to be the second conductor , 112 to be the second isolation layer , as stated in the rejections, the second conductor is connected to the first conductor and the second isolation layer is situated over the second conductor.

Applicant also argued that the resist layer 26 of Naya is not a dielectric layer nor is it included in the final structure. The examiner disagreed, photoresist material is well known in the art to be a polymeric material which is a dielectric. Whether it is included in the final structure is immaterial since an intermediate structure still meets the limitations of the claims.

Therefore the combination of Giri with the stated references does make obvious all the limitations of the rejected claims 1-32.

Applicants are referred to the re-statement of the rejection given below.

Claim Rejections - 35 USC § 103

2a. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 6-15, 17-20, and 22-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giri et al. (U. S. Patent 6261467, hereinafter "Giri") in view of Naya (U.S. Patent 6077765).

[Claims 1 and 17] Referring to Figs. 1, 1A, 3A, and related text, Giri discloses a structure and a method of fabricating the same, the method comprising the steps of: fabricating a first conductor 102; forming a first isolation layer 108 over said first conductor; fabricating a second conductor 110 over said first isolation layer, an under bump metal 118 (see Figs. 1A) , said second conductor having at least one external pad ; wherein said second conductor is connected to said first conductor (see Fig. 1A, area under the ball); forming a second isolation layer 112 over said second conductor, said second isolation layer having at least one hole (area containing the balls) over said at least one external pad of said second conductor; fabricating a bump attach site at said at least one hole over said at least one external pad. But it does not disclose expressly that the second isolation layer is also over the under bump metal. However, the missing limitation is well known in the art because Naya discloses that the under bump is conventionally formed over the first isolation layer 23 and under the second dielectric 26 (See Fig. 2). A person of ordinary skill is motivated to modify Giri with Naya to obtain a second conductor of desired pattern formed simultaneously with the under bump.

[Claims 2 and 18] Giri also discloses wherein said under bump metal comprises material selected from the group consisting of copper and aluminum (see col. 2, lines 54-67);

[Claims 3 and 19] wherein said first conductor is between approximately 2.0 microns and 5.0 micron thick (see col. 3, lines 60-67);

[Claims 4 and 20] wherein said first isolation layer comprises at least one via (see Fig. 1);

[Claims 6 and 22] wherein said first conductor comprises interconnect metal (see col. 3, lines 32-67); and

[Claims 7 and 23] wherein said interconnect metal comprises material selected from the group consisting of copper and aluminum (see col. 3, lines 31-48).

[Claims 8 and 24] The combined teaching of Giri and Naya does not teach the thickness of the first conductor to be in the range between approximately 1.0 to 2.0 microns. However any variation in thickness in the present claims is obvious in light of the cited art, because the changes in thickness produce no unexpected function. The routine varying of parameters to produce expected changes are within the ability of one of ordinary skill in the art. Patentability over the prior art will only occur if the parameter variation produces an unexpected result. In re Aller, Lacey and Hall, 105 U.S.P.Q. 233, 235. In re Reese 129 U.S.P.Q. 402, 406.

[Claims 9 and 25] The combined teaching of Giri and Naya discloses substantially the limitations of claims 9 and 25, as shown above. But it does not disclose wherein said first conductor is patterned from a layer of under bump metal. However, it would have been obvious for a person of ordinary skill in the art to do so when a bump is needed at a location on the first conductor. This would simplify the manufacturing process.

[Claims 10 and 26] Giri also discloses wherein said layer of under bump material comprises material selected from the group consisting of copper and aluminum (see col. 3, lines 38-48);

[Claims 11 and 27] wherein said first conductor is between approximately 2.0 microns and 5.0 micron thick (see col. 3, lines 60-67);

[Claims 12, 13, 28, and 29] wherein said first isolation layer comprise a dielectric (see col. 4, lines 13-25). Giri does not disclose expressly that the second isolation layer (the passivation layer 112) comprises a dielectric. However, the examiner takes Official Notice that it is well known in the art that a silicon nitride, silicon oxide, or an organic dielectric is conventionally used as a passivation layer.

[Claims 14 and 30] The combined teaching of Giri and Naya discloses substantially the limitations of claims 14 and 30, as shown above. But it does not disclose the claimed thickness of the isolation layers. However any variation in thickness in the present claims is obvious in light of the cited art, because the changes in thickness produce no unexpected function. The routine varying of parameters to produce expected changes are within the ability of one of ordinary skill in the art. Patentability over the prior art will only occur if the parameter variation produces an unexpected result. In re Aller, Lacey and Hall, 105 U.S.P.Q. 233, 235. In re Reese 129 U.S.P.Q. 402, 406.

[Claims 15 and 31] Giri also discloses wherein said second conductor is situated substantially directly above said first conductor (see Fig. 1).

Therefore, it would have been obvious to combine Giri with Naya to obtain the invention as specified in claims 1-4, 6-15, 17-20, and 22-31.

4. Claims 5 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giri in view of Naya, as applied to claims 1-4, 6-15, 17-20, and 22-31 above, and further in view of Utsumi et al. (U.S. Patent 6091310, hereinafter "Utsumi").

The combined teaching of Giri and Naya discloses substantially the limitations of claims 5 and 21.

But it does not disclose expressly wherein said first conductor is connected to said second conductor through said at least one via so as to form an inductor.

However, the missing limitation is well known in the art because Utsumi discloses this feature (See fig. 9, # 20).

A person of ordinary skill is motivated to modify Giri and Naya with Utsumi to obtain circuit with inductor to achieve desired characteristics .

Therefore, it would have been obvious to combine Giri and Naya with Utsumi to obtain the invention as specified in claims 5 and 21.

5. Claims 16 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giri in view of Naya, as applied to claims 1-4, 6-15, 17-20, and 22-31 above, and further in view of Maurant (U.S. Patent 5886589).

The combined teaching of Giri and Naya discloses substantially the limitations of claims 16 and 32.

But it does not disclose expressly wherein said first conductor and said second conductor are cross-coupled so as to form a transformer.

However, the missing limitation is well known in the art because Maurant discloses this feature (See fig. 2A).

A person of ordinary skill is motivated to modify Giri and Naya with Maurant to obtain circuit with transformer to achieve desired characteristics of the circuit.

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Therefore, it would have been obvious to combine Giri and Naya with Mourant to obtain the invention as specified in claims 16 and 32.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ha Nguyen whose telephone number is (703)308-2706 . The examiner can normally be reached on Monday-Friday from 8:30AM to 6:00PM, except the first Friday of each bi-week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (703) 308-3325. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Ha Nguyen
Primary Examiner
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